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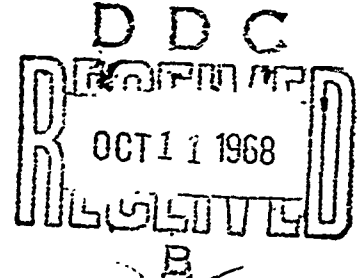
COALITIONS AND STRATEGY IN SMALL GROUPS

W. Edgar Vinacke

Nonr 4374(00)

Final Report

October 1, 1968

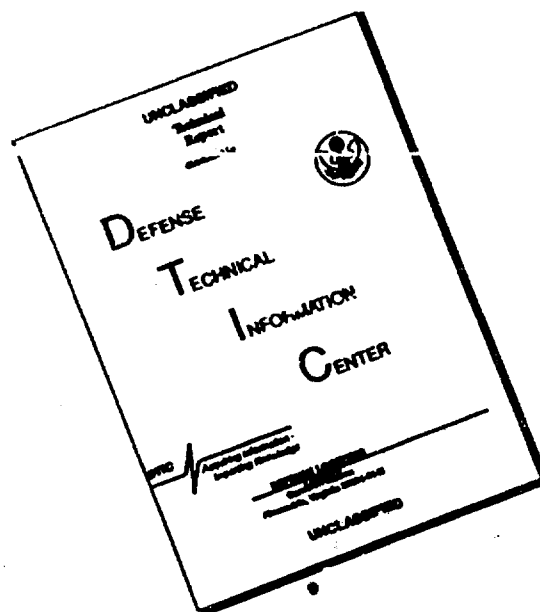


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## **Coalitions and Strategy in Small Groups:**

### **Final Report**

#### **Brief History of the Project**

1. Initiated in February, 1962, at the University of Hawaii.
2. Transferred to State University of New York at Buffalo, September, 1963.
3. Renewed for one year, February, 1965.
4. Extended to October 31, 1967.
5. Submission of Final Report, October 1, 1968.

#### **Summary of Objectives**

The project arose from studies of coalition-formation in triads, following theoretical analyses by Theodore Caplow (1956). The aim was to investigate the characteristics of bargaining and decisions in small groups under conditions of varied power relationships among the members. This interest has been extended to inter-triad competition and negotiation and to groups of larger size (4 through 9). In addition to variations in power pattern, sex differences have been a central interest, leading to concepts of exploitative and accommodative strategy and their effects. Specific problems are indicated in the summaries of the 13 technical reports, presented below.

**Background Research.** Several experiments constitute the base on which project studies were formulated, as follows:

Vinacke, W. E., and Arkoff, A., 1957. An Experimental Study of Coalitions in the Triad. American Sociological Review, 22, 406-414.

In this experiment, intended to test Caplow's theory that coalitions arise from perceptions of strength, 30 male triads played a simple board game. Power patterns were varied by assigning weights to players, in accordance with which moves were determined. Results confirmed Caplow's principle that the weaker members would ally against the stronger.

Vinacke, W. E., 1959. The Effect of Cumulative Score on Coalition Formation in Triads with Varied Patterns of Internal Power. American Psychologist, 14, 381 (Abstract).

This paper, reported at the annual convention of the APA, showed that coalitions depend not only on relative strength of players, but also on the sequence of outcomes. Players behind tend to ally against the one who is ahead, regardless of strength. However, this tendency does not completely overcome the preference for weak pairs.

Vinacke, W. E., 1959. Sex Roles in a Three-Person Game. Sociometry, 22, 343-360.

The Vinacke and Arkoff game was used to obtain data on 30 female groups, under both game-by-game and cumulative-score conditions. The chief finding was a markedly different strategy on the part of the female groups, featured by avoidance of coalitions, formation of triple alliances, less bargaining, etc.

Iwakazi, Eileen, 1960. The Friendship Variable in Coalitions in the Triad. Unpub. MA thesis, University of Hawaii.

This study compared triads composed of friends vs. triads of non-friends. Few differences were found. However, all Ss were Japanese-Americans, with the possibility that special cultural norms operated. It is possible that standards of behavior in Japanese culture are similar in interacting with friends and strangers.

Chaney, Marilyn V., and Vinacke, W. E., 1960. Achievement and Nurturance in Triads Varying in Power Distribution. Journal of Abnormal and Social Psychology, 60, 175-181.

Triads (male) were composed of one S high in achievement (and low in nurturance), one S high in nurturance (and low in achievement), and one S intermediate in both respects. It was found that Ss high in achievement tend to initiate offers to ally, whereas those high in nurturance tend to be the recipients of offers. In addition, there was evidence that Ss high in achievement engage in a strategy that maximizes their resources.

Saunders, Marion G., 1960. A Cross-Cultural Study of Coalitions in the Triad. Unpub. MA thesis, University of Hawaii.

This study employed as Ss male triads from various island groups of the Trust Territory. It was found that certain Micronesian cultures are characterized by the strategy especially characteristic of American female groups. One such culture, however, displayed the strongly exploitative strategy typical of male American groups. These findings appear to be in

line with anthropological evidence.

Bond, J. R., and Vinacke, W. E., 1961. Coalitions in Mixed-Sex Triads. Sociometry, 24, 61-75. (Reprinted in Vinacke, W. E., Wilson, W., and Meredith, G., 1964, Dimensions of Social Psychology. Chicago: Scott, Foresman).

This experiment employed triads composed of two males and one female and of two females and one male. The results showed the effect of a majority, together with differences associated with the sex of the majority. In this paper, the concepts of accommodative and exploitative strategy were elaborated.

Uesugi, T. K., and Vinacke, W. E., 1963. Strategy in a Feminine Game. Sociometry, 26, 75-88.

A special quiz game with feminine content was devised to determine whether sex differences previously found would still occur in this different situation. Evidence appeared that females increase in accommodative tendencies in a feminine situation, but males do not differ in it, compared to the (masculine) board game.

Research Supported under the Contract. The foregoing experiments suggested a large variety of additional problems, leading to 13 technical reports, as well as other studies. Several articles, based on these reports, have been published. In the following summary, published reports are indicated, together with the relevant technical report.

Vinacke, W. E., 1964. Puissance, Stratégie, et Formation de Coalitions dans les Triades dans Quatre Conditions Expérimentales. Bulletin du C.E.R.P., 13, 119-144. Originally issued as Technical Report No. 1, October 12, 1962.

This paper brought together the data for 120 triads of each sex. Thirty groups of each sex played the board game under each of four incentive conditions: game-by-game (with only points as a reward), cumulative score (with points as a reward, but with scores maintained accumulatively over 18 games), delayed payoff (monetary reward for points earned after the 18 games were completed and a \$10 bonus to the highest-scoring individual in all 30 groups), and immediate payoff (monetary reward given following each game event with a bonus given in each group at the end of 18 games). A variety of effects were found, associated with special incentive conditions. However, sex differences were similar and significant under all incentive conditions.

Vinacke, W. E., and Stanley, Susan, 1962. Strategy in a Masculine Quiz Game. Nonr 3748(02), Technical Report No. 2. (November 9).

A game comparable to that used in the Uesugi and Vinacke study was devised, with content based on masculine interests. Although the same general sex differences occurred, the use of masculine content resulted in a number of specific differences from both the board game and the feminine quiz game.

Vinacke, W. E., and Gullickson, G. R., 1964. Age and Sex Differences in the Formation of Coalitions. Child Development, 35, 1217-1231. Issued as Technical Report No. 3, Nonr 3748(02), 1963.

The board game was used with male and female triads of ages 7-8 and 14-16. Compared to college-age triads, females did not differ in accommodative behavior across these age-groups. However, male triads displayed a progression from younger to older ages. At 7-8, males were highly accommodative, becoming increasingly exploitative as age increased. There is reason to suppose, then, that males learn how to be exploitative.

Vinacke, W. E., 1964. Intra-Group Power Relations, Strategy, and Decisions in Inter-Triad Competition. Sociometry, 27, 25-39. Issued as Technical Report No. 4, Nonr 3748(02), 1963.

Pairs of triads (homogeneous in sex) engaged in competition in a multiplication and a matching game, in four different power patterns. Under these conditions, there was a very high degree of intra-group consensus on decisions, rather than formation of coalitions. When winning and losing teams in the multiplication game were compared, a variety of differences were disclosed. These were interpreted as indicating that both skill and decision-making ability characterize winning teams, and that some teams win primarily because of skill, others primarily because of decision-making ability.



Amidjaja, Imet R., and Vinacke, W. E., 1965. Achievement, Nurturance, and Competition in Male and Female Triads. Journal of Personality and Social Psychology, 2, 447-451.

A follow-up of the Chaney and Vinacke study included female triads, and a different test of achievement and nurturance. Results for males were confirmed, but differences between females in motivational characteristics were not associated with differences in strategy.

Vinacke, W. E., Ragusa, D., and Crowell, D., 1964. Strategy in Three Games: A Replication. Nonr 4374(00), Technical Report No. 5, February 15, 1964.

Four power patterns were used with triads of each sex in the board game, masculine quiz game, and feminine quiz game. Order of games was counterbalanced and half of the triads were run by a male experimenter, half by a female experimenter. The results supported the general difference between the two sexes in all three games. However, the three types of games did not differ significantly. The character of the game was associated with specific sex differences, including greater interest in the "feminine" game by the female Ss, accompanied by more bargaining (less bargaining in male groups), and a greater tendency in female triads for the two players who were behind to ally in the Feminine Quiz Game (an opposite tendency for the males).

Vinacke, W. E., Crowell, Doris C., Dien, Dora, and Young, Vera, 1966. The Effect of Information about Strategy on a Three-Person Game. Behavioral

Science, 11, 180-189. Issued as Nonr 4374(00), Technical Report No. 6, SUNY/B, April 2, 1964. (Reprinted in P. G. Swingle, ed., Experiments in Social Psychology, New York: Academic Press, 1968).

This experiment was designed to meet some criticisms of the Vinacke and Arkoff procedure, raised by Kelley and Arrowood (1960). In particular, a learning phase preceded an information phase. In the latter phase, either (1) one S was provided with information about "strictly rational" and "perception of weakness" strategy, (2) two Ss were informed, or (3) all three Ss were informed. Six power patterns were used. There was no evidence for coalitions to shift, following information, toward the "strictly rational" outcome (i.e., no preference for one member than another when any pair can win). The informed players did not differ from the uninformed players. However, based on a post-session questionnaire, triads with the greatest understanding of the power relationships tended to reach weak coalitions less often. Another item, measuring motivation to win, was associated with formation of weak coalitions. The higher the incidence of "win" the fewer the weak coalitions, in both sexes. This finding suggests that information chiefly increased motivation, with consequently increased exploitative behavior, rather than inducing more "rational" play.

Vinacke, W. E., and Ragusa, D., 1964. Two Tests to Measure Exploitative and Accommodative Strategy. Nonr 4374(00), Technical Report No. 7, SUNY/B.

Questionnaire and projective tests were administered to the triads employed in the replication study. Analyses to determine their reliability and validity were reported, indicating that both tests are satisfactory, with the questionnaire superior. It was also shown that mean scores for triads have respectable validity.

Bodin, A. M., 1965. Family Interaction, Coalition, Disagreement, and Compromise in Problem, Normal, and Synthetic Family Triads. Nonr 4374(00), Technical Report No. 8, SUNY/B.

Triads were composed of father, mother, and adolescent son, as follows: (1) problem families, in which the son was delinquent; (2) normal families, in which the son was not delinquent; and (3) synthetic families, in which father, mother, and son all came from different (normal) families. These triads interacted both in the board game and in a decision-making task, in which there were issues pertinent to family life. There were no general differences in accommodative strategy on the board game (in fact, all three types of families appeared to be highly accommodative, as might be expected in comparison with ad hoc laboratory groups). There were, however, a number of specific differences in behavior. In the decision-making task, the synthetic families were in most disagreement initially and compromised most in reaching final consensus. In both types of authentic families, the father-mother pairs were in closest agreement, but in the synthetic families, the mother-son pairs were in closest agreement. The son compromised in all three types, the mother

the least in the normal families. The mother's role was crucial, but differed in the three types.

Vinacke, W. E., Lichtman, C. M., and Cherulnik, P. D., 1967.

Coalition Formation under Different Conditions of Play in a Three-Person Competitive Game. Journal of General Psychology, 77, 163-176. Issued under the title, Stochastic versus Deterministic Conditions in a Competitive Game with Two Lengths of Board, as Nonr 4374(CO), Technical Report No. 9, SUNY/B, 1965.

This experiment sought to determine the effects of "luck" in forming coalitions. In one condition each player in turn threw the dice to determine his own distance of move (in the Board Game); in a contrasting condition, each player in turn threw the dice to determine the moves of all three players. In addition, there were two lengths of board, a short one and a long one. In general, the stochastic and short board conditions reduced the incidence of coalitions, thus probably reflecting a tendency to gamble on outcomes. Evidence was also obtained for the validity of the Test of Strategy, especially for males, and especially under deterministic conditions. (This last material is presented in Report No. 9, but not in the published article.)

Shears, Loyda M., 1965. The Effect of Variations in Internal Power Pattern on Coalition Formation in Tetrads. Nonr 4374(OO), Technical Report No. 10, SUNY/B.

This report summarized research conducted by Dr. Shears at the University of Hawaii for her Ph.D. The board game was played with groups of four, under both game-by-game and cumulative-score conditions. Male and female tetrads played the game under five different power patterns. In general, there was a marked tendency for strong winning coalitions to occur, rather than weak winning triple coalitions. This result, therefore, suggests an important difference between triads and larger groups. In reaching deals, there was a clear departure from proportional allocation, with the weaker players, when included in coalitions, receiving more than their proportional share. Sex differences were found which correspond to those found in triads.

Vinacke, W. E., Cherulnik, P. D., Morganti, J., Ryckman, R., and Sibley, R., 1966. Winning and Losing Teams in Three Games under Conditions of Intra-League Competition. Nonr 4374(00), Technical Report No. 11, SUNY/B.

Four leagues of each sex, with four teams per league (except for one male league of three teams) played three games in round-robin arrangements. Substantial monetary prizes could be won. Numerous variables differentiated among teams within leagues. Attempts to develop general measures of winning and losing were inconclusive, leading to the notion that such leagues tend to have individual patterns of factors responsible for success. In general, however, it appeared that "skill" factors in conjunction with "strategy" characteristics operate especially in female leagues. Since this study was completed, Richard Ryckman has carried out

a study for his Ph.D. dissertation, partially supported by the contract, in which he studied several bowling leagues at a local lane. His conclusions on these natural groups are substantially in agreement with the laboratory study, as stated above.

Vinacke, W. E., Cherulnik, P. D., and Lichtman, C. M., 1968. Strategy in Intra-Triad and Inter-Triad Interaction. Nonr 4374(00), Technical Report No. 12, SUNY/B. (Submitted for publication).

This study sought to pursue farther the characteristics of inter-group negotiation. In effect, we established "triads of triads," in which one group was composed of members high in accommodative strategy (as measured by the Test of Strategy), one of members low in accommodative strategy (i.e., high in exploitative strategy), and one of members moderate in accommodative strategy. There were eight of these sets for males and seven for females. Three games were played: the Board Game, Accommodation Problems, and the Politics Game. These games were played first under intra-triad negotiation (each triad separately) and then under inter-group negotiation. Weights were manipulated within and between triads to constitute power patterns. Conditions varied for each game. In the Board Game, the standard procedure was used. In the Accommodation Problems, three sets of instructions were used: engage in discussion, obtain the most possible, and arrive at the fairest solution. In the Politics Game, representatives of the group met for the inter-group condition. The chief findings were: (1) greatly

reduced sex differences when Ss are compared at comparable levels of accommodativeness; (2) exploitative groups differ from accommodative groups similarly in the three games, and in inter-group negotiation similarly to intra-group negotiation; and (3) situational variables markedly alter the expression of strategy characteristics (for example, producing greater consensus under "fair" compared to "most" instructions).

Vinacke, W. E., 1968. Negotiations and Decisions in a Politics Game. Nonr 4374(00), Technical Report No. 13, SUNY/B. Prepared for the Social Choice Conference at the University of Pittsburgh, September 9-12, 1968, and to be published in the volume issuing from that conference.

This experiment utilized a game that simulates political decision-making, ranging from the initiation of coalitions, through conferences, to actual elections. Groups homogeneous in sex ranged in size from three through nine, totalling 49 male groups and 56 female groups. Results compared a large number of variables on size, sex, and power patterns (five were used). The chief findings were, as follows: (1) coalitions and deals vary with size primarily, with power pattern as a secondary factor; (2) there is a shift toward coalitions that involve the strongest member (especially in male groups) as size increases beyond three; (3) the weakest members, when included in coalitions, receive more than their proportional share of the "spoils," the strongest members less; (4) differences between exploitative and accommodative strategy are highly significant at all sizes, with evidence that male (exploitative) groups

became increasingly exploitative as size increases, and that female (accommodative) groups may become increasingly accommodative as size increases; however, marked departures from this trend in female groups of 4 and 6 prevent this trend from achieving statistical significance.

Other Items Related to the Project.

Vinacke, W. E. Variables in Experimental Games: Toward a Field Theory. To be published in Psychological Bulletin. (Based on a paper read at the Western Small Groups Conference, San Diego, March 27, 1968.)

This paper reviews in detail research on games, focusing especially on the Prisoner's Dilemma and related dyadic games and on games with triads (especially the Board Game). It examines findings from manipulation of task variables, situational variables, and personality variables. In each category there are significant effects, leading to the conclusion that we require a broad approach that recognizes the importance of all classes of variables. Several special problems are pointed out.

Three-Person Matrix Games. Several of my students and I have explored the problems that arise in games that present fixed payoff-matrices to three players. Outcomes depend on choices contingent on all three members' decisions. One student has conducted a study that compares negotiation and non-negotiation conditions, when players differ in their strategy characteristics. In general, it was found that coalitions are formed in this kind of game, and that permitting negotiation serves to promote coalitions effective in overcoming the superior power of one of the



players. Another student is examining the effect of negotiations between two players as they affect the outcomes of a third (bystanding) player. This study is still in progress. It is expected that further studies will be developed during the coming year.

#### Directions for Future Research

A number of important problems arise from the experiments described above. We are interested in further explorations of the matrix games just mentioned. Such games are highly constrained, but nevertheless appear to elicit coalition processes. Central to the matter is variation in power (rather than equality among the players). It will be interesting to determine the effects of various kinds of relationships among players, of manipulating special information and negotiation conditions, of introducing personality and incentive variations, etc. So far as I know there have been very few, if any, attempts directly to compare three-person matrix games with two-person matrix games (such as P-D).

Inter-group negotiation is another area which we have attempted to explore, with results that leave much to be desired. We hope to investigate under better-controlled conditions the processes of coalition-formation and decision outcomes between and among groups. Such problems range from the triadic situation described in Technical Report No. 12 to an intensive study of "blocs" and their behavior. For example, the procedure followed in the Politics Game readily permits the establishment

of sub-groups. Thus, in a group of nine, rather than assigning weights to individual players, we can compose sub-groups of varying number, such as 3-3-3, 4-4-1, 4-3-2, etc. The findings reported in Technical Report No. 13 provide a number of hypotheses to be tested.

The Accommodation Problems, described in Technical Report No. 12, offer numerous important possibilities to study strategy. These problems were devised to be more appropriate for the exercise of accommodative (female) strategy than the predominantly "masculine" competitive games used in other experiments. Each problem presents to the group a three-person situation, in which the parties have diverse interests (for example, a high school principal, a high school teacher, and a high school student). These situations may involve three parties who have essentially equal resources or power or status, three parties who differ, one party who has the potential to control the outcome completely, etc. The possible outcomes, however, are always less than the total needs or wishes represented by the three members. Thus, they must somehow reconcile their interest. We have felt that such problems may be realistic in an accommodative sense. At any rate, they provide a special context in which coalitions and decisions can be studied.

Finally, there has developed in the past ten years a substantial theoretical interest in coalition-formation. There continue to be controversies between advocates of "strictly rational" (e.g., minimum power) and "nonrational" (e.g., minimum resource) and "anticompetitive"

theories. We hope that research supported by the contract has contributed to clarification of these theories--if, perhaps, not wholly to resolution of the controversy. In the last analysis, our understanding of processes of coalition formation and decisions depends on the empirical testing of hypotheses. It is to this end that further research will be planned.

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| 13. ABSTRACT<br><br>The total body of work supported by and related to the contract (Nonr 4374(00), Project No. NR 170-270) is summarized. Background for this research was represented by seven studies of coalitions in triads. Under the contract itself, thirteen technical reports have been issued, of which six have been published or publication is expected. Each of these reports is briefly summarized. Research growing out of this work is described, together with an indication of possible future directions. |                                  |   |

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